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### (54) Methods of fracturing subterranean formations

(57) The improved recovery of hydrocarbons from subterranean formations by hydraulically fracturing a subterranean formation is accomplished. Fracturing fluids using a viscoelastic surfactant fluid containing worm-like micelles are useful to improve recovery of hydrocarbons and limit the loss of fracturing fluid into the formation fracture face. The invention further relates to novel fracturing methods useful for increasing hydrocarbon

production, limiting connate water production, resisting fracturing fluid loss into the subterranean formation, and reducing the equipment requirements in mixing and pumping fracturing fluid. The action of micelles of surfactant in aqueous zones of the subterranean formation facilitates the flowback of increased amounts of hydrocarbons once a fractured well is placed back on production.

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## EUROPEAN SEARCH REPORT

Application Number

EP 97 40 2258

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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X	US 4 790 958 A (A.S. THEOT) 13 December 1988 * column 5, line 9 - line 14 * * column 12, line 5 - line 8 * ---	1	
A	US 4 418 755 A (T.R. SIFFERMAN) 6 December 1983 * claim 11 * ---	2	
A	DATABASE WPI Section Ch, Week 9312 Derwent Publications Ltd., London, GB; Class A97, AN 93-098785 XP002090141 & SU 1 724 859 A (GIPROVOSTOKNEFT DES INST), 7 April 1992 * abstract * ---	2	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
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A	GB 1 388 909 A (MARATHON OIL COMPANY) 26 March 1975 * claim 1 * ---	2	
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The present search report has been drawn up for all claims			
Place of search	Date of completion of the search		Examiner
THE HAGUE	15 January 1999		Hilgenga, K
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	



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DOCUMENTS CONSIDERED TO BE RELEVANT			
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A	WO 94 09852 A (THE DOW CHEMICAL COMPANY) 11 May 1994 * claims AMENDED, 1,12 *		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	15 January 1999	Hilgenga, K	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons S : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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